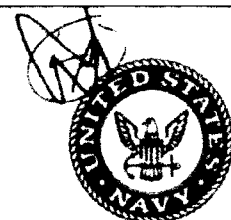


Navy Personnel Research and Development Center

San Diego, California 92152-7250

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On-the-Job Training Practices on Navy Ships



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13. ABSTRACT (Maximum 200 words) <p>This report describes the results of a questionnaire designed to assess Navy on-the-job training (OJT) practices. The questionnaire was based on shipboard observations and on a model of the on-the-job trainer as a coach who guides the trainee through a task using three steps: (1) assessment (2) training, and (3) evaluation. The questionnaire was sent to over 5,000 shipboard supervisors; 2,321 responded.</p> <p>Three major conclusions can be drawn from the information and data provided in the report. First, OJT is an important component of the Navy training process and should become even more important as the Navy increases the emphasis on shipboard training in the coming years. Apprentice training and "A" school training do not and will not produce personnel capable of independently performing jobs. Second, very few shipboard petty officers receive any information or training on how to conduct OJT. Third, while over 50% of the supervisors reported that they used appropriate OJT techniques, at least 20% do not, and another 30% are not as effective as they could be. Evidence from tutor training studies shows that training can improve performance of both tutors and the students they train. Therefore, there is both a need and a capability to improve the quality of shipboard OJT.</p>				
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Foreword

This work was conducted under the Navy Personnel Research and Development Center's independent research program (Program Element 0601152N, Work Unit 0601152N.R0001.04) which is sponsored by the Office of Naval Research (Code 20P). The goals of this project were to develop a model of on-the-job training and determine how shipboard enlisted supervisors conduct on-the-job training based on the prescriptions of the model.

The recommendations provided in this report are intended for use by the Chief of Naval Education and Training and the Afloat Training Organization in determining future training requirements for shipboard supervisors.

We gratefully acknowledge the contributions of University of Kansas personnel.

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Summary

Problem and Background

In addition to the more than 7000 formal courses taught in Navy schools, a considerable amount of training is conducted on-the-job in ship and shore based commands. Much of this training occurs informally in one-on-one, one-on-two, or one-on-three situations, with a senior petty officer (e.g., E-6, E-7) working with/teaching seaman and seaman apprentice personnel on/about shipboard tasks. These senior petty officers are responsible for bringing apprentice school ("A" school) and non-"A" school graduates from novice to journeyman status through on-the-job training (OJT). Although the Navy has courses and programs that prepare petty officers to be leaders (e.g., NAVLEAD), the only course that addresses shipboard training emphasizes classroom training aboard ship and is given to very few petty officers per year (less than 600). Furthermore, evidence from tutor training studies shows that training can improve performance of both tutors and their students.

Objectives

This effort was conducted to determine how effectively OJT is currently conducted aboard Navy ships. Specifically, the objectives were (1) to describe a model of how to conduct effective OJT and (2) to assess how Navy petty officers aboard ship conduct OJT based on the prescriptions of the model.

Approach

To determine how effectively OJT is currently conducted aboard ship, we developed a model of OJT based on research on tutoring, and shipboard observations and interviews. The model, which considers the OJT trainer as a coach, has three phases: (1) assessment, (2) training, and (3) evaluation. Using the three-phase OJT model as a basis, we developed a 49-item questionnaire that was sent to over 5,000 shipboard supervisors in March 1990. Of these, 2,321 (46%) were returned. The questionnaire asked 7 questions about the personnel the respondent supervised, 3 questions about the quality of "A" school training, 22 questions about OJT practices, and 17 demographic questions.

Results and Discussion

Over 80% of the supervisors had had less than a month of formal school training in the previous year, 40% had had no formal instruction, and 25% had had only between 1 and 2 weeks. Only 10% of the supervisors had been Navy classroom instructors.

Nearly all of the supervisors surveyed reported that petty officers and chief petty officers were responsible for most of the OJT that takes place aboard ship. Half the supervisors reported spending between 3 and 10 hours per week doing supervised OJT, while 30% reported spending more than 10 hours and 20% reported spending 2 hours or less. Supervisors responded that between 25% and 50% of their time was spent working with sailors on Personnel Qualification Standards (PQSs), and 10% was spent satisfying Personnel Advancement Requirements (PARs).

When certifying completion of a PQS requirement or a PAR, 60% of supervisors reported that they almost always or always observe the trainees perform the task, 25% reported observing it sometimes, and less than 3% said they almost never or never observe it. Responding to two similar questions, 65% of the supervisors indicated that they almost never or never certify completion of a requirement if the trainees simply said they could do it, and over 60% said they would almost never or never certify completion of a requirement if someone else said the trainee could do it. However, over 30% of the supervisors who responded to these two questions reported that they would certify completion if the trainee or someone else said that the trainee had accomplished the requirement.

Over half the supervisors said that most of the time they used Planned Maintenance Subsystem (PMS) documents and technical manuals when conducting OJT. Over half also reported sometimes using special job aids and personally prepared materials. Less than 6% of supervisors reported that they never use any supplemental materials.

Responses to questions based on the assessment-training-evaluation model indicate that many supervisors are following OJT practices consistent with the model. Nearly 60% reported that most of the time they find out what the trainees know about the task before they begin training. However, 20% almost never or never find out beforehand and about 20% only do it sometimes. About 80% of the supervisors let trainees explain the task in their own words, while the rest allow it sometimes or not at all. Over 75% explain how the task relates to the overall operation of the ship, but 20% reported doing so sometimes, almost never, or never. When assessing task performance, 85% of the supervisors let the trainees demonstrate what they can do most of the time, almost always, or always, while 15% allowed it sometimes, almost never, or never. However, if trainees make mistakes while demonstrating a task, only 72% of supervisors would let them continue to demonstrate the task most of the time, almost always, or always, while 28% would allow it sometimes, almost never, or never. This suggests that when mistakes are made, OJT supervisors are less willing to let the trainees continue the demonstration. The vast majority of supervisors (80%) demonstrate skills to their trainees most or all of the time, while 20% do it sometimes or not at all.

We used responses to specific questions to compute an OJT quality index for each supervisor. We then used this index as a dependent variable for a series of one-way analyses of variance (ANOVAs). The only significant effect was for the number of hours per week the supervisor engaged in OJT, $F(6,2309) = 6.30$, $p < 0.01$. Supervisors who spent the most time per week doing OJT scored highest on the OJT quality index. This result is consistent with the prescriptions of the model. Effective and complete assessment, training, and evaluation take time. Supervisors who do not ascertain what trainees already know, demonstrate tasks, break complex tasks into smaller components, or provide explanations and feedback will not need as much time to accomplish OJT as those supervisors who do all of these things. There were no significant effects for the number of personnel supervised, pay grade, age, years in the Navy, years of Navy instructing, and having taken the shipboard instructor course.

Conclusions

We can draw three major conclusions from the facts and research cited in the introduction and the findings from the shipboard supervisor questionnaire. First, OJT is an important component of

the Navy training process and is expected to become even more important as the Navy increases the emphasis on shipboard training in the coming years. Apprentice training and "A" school training do not and are not intended to produce personnel capable of independently performing jobs. Second, very few shipboard petty officers receive any information or training on how to conduct OJT. Third, while over 50% of the supervisors reported that they use appropriate OJT techniques, at least 20% do not, and another 30% are not as effective as they could be. Evidence from tutor training studies shows that training can improve the performance of both tutors and the students they train. Therefore, there is both a need and a capability to improve the quality of shipboard OJT.

Recommendations

The Commanders-in-Chief of the Atlantic and Pacific Fleets in conjunction with the Afloat Training Organization should initiate a program to design, develop, and evaluate a training course for petty officers on how to conduct OJT based on the assessment-training-evaluation OJT model. This training could be brief, exportable, and delivered on videotape and could be accomplished by revising the existing Shipboard/Work Center Instruction Indoctrination Course (A 012 0023).

To ensure that petty officers are held accountable for their duties as on-the-job trainers, we recommend that the Afloat Training Organization develop an appropriate management system for use by ship training officers.

We also recommend that the Chief of Naval Education and Training (CNET) determine whether a similar course should become part of CNET leadership training.

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Introduction

Problem and Background

In addition to the more than 7000 formal courses taught in Navy schools, a considerable amount of Navy training is conducted on-the-job in ship and shore based commands. Training data from fiscal year 1991 show that 30% of the graduates from recruit training went to 4 weeks of fireman, seaman, or airman apprentice training and then directly to the fleet and 70% went from recruit training to introductory "A" schools. Of these, 60% went directly to the fleet upon completion of "A" school. Only 28% of all accessions in fiscal year 1991 received advance training on the systems and equipment associated with their rating prior to their first fleet assignment.

Much training conducted on-the-job occurs informally in one-on-one, one-on-two, or one-on-three situations, with a senior petty officer (e.g., E-6, E-7) working with and supervising seaman and seaman apprentice personnel as they perform shipboard tasks. One of the senior petty officer's primary supervisory responsibilities is assuring that the personnel under supervision acquire the skills and knowledge necessary for job performance (Personnel Qualification Standards [PQSs]) and for advancement in rate (Personnel Advancement Requirements [PARs]). That is, on-the-job training (OJT) involves personnel with more experience teaching those with less experience how to perform tasks such as watch standing, plotting the ship's course, using a radar system, or repairing a gas turbine. The senior petty officers are, in effect, tutors and are responsible for bringing "A" school (and non-"A" school) graduates from novice to journeyman status. Although OJT is not a formal part of Navy instruction such as classroom training, trainees spend more time on OJT than on formal training. OJT is necessary to ensure the safe operation of the ship, and, as indicated, it is one way to satisfy the PQSs and to meet PARs. Although the Navy has courses and programs that prepare petty officers to be leaders (e.g., NAVLEAD), the only course that addresses shipboard training techniques is the Shipboard/Work Center Instructor Indoctrination Course (A 012 0023) which emphasizes classroom training aboard ship and is given to very few petty officers per year (less than 600). Therefore, most Navy shipboard supervisors are not trained to conduct OJT.

Training for On-the-Job Trainers

Research on tutor training programs indicates that tutors' behavior changes significantly as a result of training. For example, Kozma, Kulik, and Smith (1977) compared untrained tutors with tutors trained with a guide designed to encourage behaviors such as attending to students, praising, asking questions, and eliciting student participation and to discourage behaviors such as lecturing and criticizing. Tutors trained with the guide demonstrated increases in all skill areas and, also, were observed to lecture students about one-third as often as did untrained tutors. Other researchers have observed similar results with programs designed to teach tutoring skills (Johnson & Sulzer-Azaroff, 1978; Robin & Heselton, 1977).

There is also evidence that trained tutors have positive effects on student performance. Studies on reciprocal teaching (Palincsar & Brown, 1984) and college tutors in an individualized course (Johnson & Sulzer-Azaroff, 1978) have shown significant improvements in student performance when tutors have been trained. In two related studies, Kuti, Hinton, Fitch, & Semb (1992) and Fitch and Semb (1992) compared role-playing and video training of tutors with an untrained control

group. Students who had trained tutors performed better on course quizzes and exams than did students who had untrained tutors. Furthermore, there were no differences between the role-play and video training groups. This suggests that video training, which is less expensive and easier to implement than role-playing, may be an effective delivery medium for tutor training. Similar training could be developed and provided to Navy petty officers who will serve as shipboard trainers.

Objectives

This effort was conducted to determine how effectively OJT is currently conducted aboard Navy ships. Specifically, the objectives were (1) to describe a model of how to conduct effective OJT and (2) to assess how Navy petty officers aboard ship conduct OJT based on the prescriptions of the model.

Approach

To determine how effectively OJT is currently conducted aboard ship, we first developed a model of OJT based on research on tutoring. Then, we used the model as the structure for conducting shipboard observations and interviews and developing a questionnaire administered to Navy petty officers aboard ship.

An On-the-Job Training Model

The model we developed views the shipboard supervisor as a coach who guides the trainee through a task using techniques that have been shown to be effective across a variety of training environments (e.g., listening, prompting, shaping, modeling, demonstrating, providing feedback). To create the model, we organized these techniques into a three-phase process: (1) assessment, (2) training, and (3) evaluation. Although these phases reflect the natural sequence a trainer follows in working with a trainee on the job, they are not discrete or separate events. (e.g., assessment and evaluation may occur during training, training may occur during evaluation when feedback is provided, or evaluation may be part of the assessment process). Therefore, while we discuss these phases separately and sequentially, they often occur together during the dynamic process of OJT.

The model assumes that the trainer has expertise in the subject matter domain and knows what needs to be taught. This assumption is obvious, but important. If the trainer does not have subject matter expertise, effective training is not likely to occur. The trainer's expertise may vary depending on the nature of the task. For example, it might involve knowing how a piece of equipment works, how to operate it, or both (Gott, 1988). Regardless of the nature of the task, the Navy generally assumes that trainers know their subject domain well--they know how equipment and systems work, how to troubleshoot problems, and how to perform corrective and preventive maintenance. It also assumes that they know how to explain the execution of these tasks and how to demonstrate them to people with less experience.

The following sections describe each phase of the process. Fitch and Semb (in press) provide empirical support and theoretical rationale for the phases in a detailed report on tutoring.

Assessment

Assessment is the process of determining what the trainee knows and can do. Because trainees usually have differing levels of knowledge and skills, it is important to determine what they do and do not know and what they can and cannot do before deciding what type of training should be given. That is the goal of assessment. To accomplish this goal, assessment involves asking questions to determine what the trainee knows and observing trainee performance to ascertain what the trainee can do. Questions measure the trainee's job knowledge and performance observations determine the trainee's job skill level.

For example, the trainer might ask, "Do you know how it works and/or how to fix it?" If the answer is "Yes" and the trainee can explain the task, there is no need for training in job knowledge. Next the trainer might say, "show me how to operate it and/or how to fix it." If the trainee can perform the task correctly, there is no need for job performance training. However, if the explanation or performance is incorrect or incomplete, the trainer must determine what and how much OJT to administer.

An important outcome of assessment is that the focus of instruction shifts from the trainer to the trainee. Giving the trainee the chance to verbalize knowledge and demonstrate skills serves not only as an assessment tool for the trainer, but also as practice for the trainee. Finally, it communicates to the trainee a sense of interest on the part of the trainer.

OJT Model Prescriptions for Assessment

When conducting OJT the trainer should (1) determine what the trainee already knows about the task by direct questioning or by reviewing the trainee's training record, and (2) determine what parts of the task the trainee can perform by observing task performance within appropriate safety limits and task constraints.

Training

The goal of training is to bring the trainee up to the desired level of performance. In the OJT situation, Knox (1986), Fitch and Semb (in press), and others view the trainer as a coach who does not merely lecture trainees, but who guides and directs their learning. Once assessment is completed and trainee knowledge and performance goals are established, the training process begins. OJT should be a continuous, interactive process in which the trainer prompts the trainee to perform. The trainer is not only a source of knowledge or skills but is also the evaluator of the trainee's acquisition of knowledge and skills. The trainer repeats the steps as necessary until the trainee reaches criterion or the session ends. As Palincsar and Brown (1984) point out, there is a "continuous evaluation and revision in the teacher's theory of the student's competence, a theory that must be responsive to the level of participation of which the student is currently capable" (p. 169).

The trainer has a variety of techniques, strategies, and methods available to accomplish the goals of OJT (e.g., modeling, demonstration, Socratic questioning, incremental instruction, scaffolding, providing examples and non-examples, providing opportunities for practice and

rehearsal, giving structured feedback). We will briefly review some of the ones that are used most frequently.

Incremental Instruction. Incremental instruction is an OJT strategy in which the trainer breaks down the skill or knowledge into a series of smaller, sequential steps (Broadwell, 1986; Fyock, 1991; Keller, 1968, 1974; Knox, 1986; Osborn, Ford, Moon, Campbell, Root, & Word, 1975; Palincsar, Brown & Martin, 1987; Rogoff, 1990; Skinner, 1958). The trainer then requires the trainee to perform each step before moving on to a more advanced level. Incremental instruction is appropriate for tasks that have several steps that are performed in the same sequence each time the task is executed. Tasks in which the sequence of steps is variable or in which steps are performed simultaneously may require different instructional approaches (Lave & Wenger, 1991).

Modeling and Demonstration. Before allowing trainees to practice, many authors recommend demonstrating or modeling the skills (Broadwell, 1986; Goldstein & Sorcher, 1974; Knox, 1986; Palincsar et al., 1987). Others disagree, suggesting that it is more effective to let trainees discover relationships between concepts and actions for themselves unless safety factors warrant otherwise (Knox, 1986; Mechner, 1965; Osborn et al., 1975; Raizen, 1989; Skinner, 1958). Both positions have merit; however, in most Navy OJT situations (and possibly in most technical training situations), time and safety factors preclude using the discovery approach. In the Navy environment, demonstration and modeling can provide the trainee with an example of what the final performance should look like, but assuming that these activities translate into performance is a mistake. Only after the trainee has performed the task can the trainer be certain that the task has been learned.

Practice and Rehearsal. Giving the trainee the opportunity to rehearse or practice is essential for OJT. Practice may begin by having a trainee "talk" through a job before actually doing it (Broadwell, 1986; Knox, 1986). However, people learn better when they are actively involved with training and when they experience the consequences of their actions (Broadwell, 1986; Knox, 1986; Parry, 1991). Practice gives the apprentice opportunities to construct meaningful problem-solving relationships: to create solutions, to perform efficiently, and to engage in activities that may promote transfer (Glaser & Bassok, 1989; Gray & Orasanu, 1987; Raizen, 1989). Throughout training, practice should be combined with guided correction to focus the trainee and to prevent the learning of inappropriate behaviors (Frey & Reigeluth, 1986; Knox, 1986; Raizen, 1989).

OJT Model Prescriptions for Training

When conducting OJT, the trainer should (1) demonstrate or model the skills to be learned, (2) break the task down into small sequential steps if appropriate, and (3) provide opportunities for the trainee to practice.

Evaluation

Corrective feedback and reinforcement, provided by the trainer, are the primary components of the evaluation process. Both can dramatically affect performance. Feedback, the means by which trainees gain information about their learning activities (Knox, 1986), occurs at two levels. The

first level is the knowledge of results trainees acquire by monitoring their own performance and the second level is the feedback the trainer provides.

The benefits of feedback during learning are well documented (Locke, Shaw, Saari, & Latham, 1981; Schmidt, Young, Swinnen, & Shapiro, 1989). Feedback can help to "shape" the gradual attainment of a skill (Jacobs, 1974). Knox (1986) asserts that feedback is important, because knowledge about progress helps to guide the trainee. Raizen (1989) states that feedback teaches the novices to identify their own errors. A review of several peer-teaching models led Frey and Reigeluth (1986) to conclude that effective training contains an element of corrective feedback.

There are many ways to use feedback. Skinner (1958) argues that feedback should be given for every response. Goldstein and Sorcher (1974), Knox (1986), and Schmidt and Bjork (1992) disagree, stating that a learner will become more self-correcting and directed if feedback occurs intermittently. This technique is assumed to discourage dependency on the part of the trainee and to encourage more self-correction. Using intermittent feedback to promote higher levels of performance during and after training has a strong empirical base (Schmidt & Bjork, 1992).

Just as important as the knowledge the trainer provides, however, is how it is delivered. This relates to issues of reinforcement and punishment (Keller, 1968; Skinner, 1958). Reinforcement and feedback are frequently delivered concurrently. Knowledge of results and reinforcement represent different aspects of the process, and, from a theoretical perspective, they deserve to be separated. However, from a practical standpoint, this is difficult to accomplish in most settings (Fitch & Semb, in press). To be most effective, trainers should provide both knowledge of results and reinforcement. Reinforcement in most training environments typically involves positive comments about the accuracy or adequacy of the performance. It may also be more subtle, such as smiling or nodding in encouragement while the trainee is talking or performing a task.

One type of reinforcement, praise, is a particularly powerful and easy-to-use way of letting trainees know when they have done a good job (Keller, 1968). To be most effective, praise should be directed at the trainee's performance and not the trainee. Praise directed at the trainee can frequently be misinterpreted by both the recipient and others. Harrison and Guymon (1980) provide four guidelines for delivering reinforcement: (1) create opportunities for success, (2) avoid saying "no," (3) consistently praise and encourage the trainee, and (4) give special recognition for achievement. Finally, effective trainers avoid tactics, such as criticism, cynicism, ridicule, sarcasm, and degradation, that can damage future performance as well as the trainee's self-esteem.

OJT Model Prescriptions for Evaluation

When conducting OJT, the trainer should (1) guide the trainee through task performance, providing informative and corrective feedback as appropriate, (2) encourage trainee performance through reinforcement techniques such as praise, and (3) avoid ridicule, sarcasm, and degradation.

Shipboard Supervisor On-the-Job Training Survey

To obtain data on OJT performance, we developed a 49-item questionnaire based on the assessment-training-evaluation model prescriptions. In March 1990, questionnaire packages were

mailed to 46 Navy surface ships for distribution to over 5000 E-5, E-6, and E-7 shipboard supervisors.

The questionnaire was based on the OJT model and shipboard observations and interviews conducted in 1989 and was divided into four sections. The first section required respondents to provide information about the personnel they supervise; the second asked about the quality of "A" school training; the third contained questions on OJT practices; and the fourth asked for demographic information including pay grade, years in service, rating, age. The complete questionnaire is provided in the appendix.

Results and Discussion

Of the 5,000 questionnaires, 2,321 (46%) were returned. The responses are presented and discussed in a different order than in the questionnaire. Demographic data are presented first, followed by information about personnel supervised and the respondent's training history, which are present together. The last section presents data on OJT practices.

Demographic Information

Of the supervisors who responded, 61% were E-6s or E-7s; 56% had been in their command 1 to 3 years; 30%, less than 1 year; and the remaining 13%, 4 to 7 years. Over 90% had between 1 and 12 years of sea duty; most had between 4 and 7 years at sea. Supervisors were most often Boatswain's Mates, Boiler Technicians, Electrician's Mates, Electronics Technicians, Fire Control Technicians, Gunner's Mates, Machinist's Mates, Mess Management Specialists, Operations Specialists, Radiomen, and Storekeepers.

Supervisors were asked how much formal-school training they had received in the last 12 months: Over 80% reported having received less than 1 month; 40% had not been to school and 25% had had 2 weeks or less of school. Only 10% of the supervisors had been Navy classroom instructors. Less than 5% had taken the Shipboard/Work Center Instructor Indoctrination course (A 012 0023) or had used any of the techniques taught in the course. These results support the data presented in the introduction that very few shipboard supervisors receive the Shipboard/Work Center Instructor Indoctrination course. Clearly, most shipboard supervisors have had no training in the conduct of OJT or schoolhouse instruction. Table 1 summarizes the responses to selected demographic questions.

Information About Personnel Supervised and "A" School Quality

Respondents reported that 45% supervised more than 7 trainees, while 47% supervised between 1 and 7. Although 7% reported that they supervised no personnel, sometimes junior petty officers (E-5s) are responsible for OJT (e.g. PQS, PARs) even though they may have no direct supervisory responsibility. Over 85% of the trainees for whom the respondents were responsible had been to an "A" school, and 55% had been to a "C" school. In response to a question about how well "A" school graduates are prepared for supervised OJT, 63% rated "A" school graduates as average or better, but only 5% rated "A" school graduates as very well prepared; 37% of the supervisors rated "A" school graduates as marginal or unprepared. When asked to compare "A" school graduates with personnel who had not attended "A" school, 9% of the supervisors rated

Table 1
Summary of Responses to Selected Demographic Questions

Question	Supervisor Responses					
	Less than 1	1-3	4-7	8+		
1. Years at present command.	30%	56%	13%	1%		
2. Years of sea duty.	Less than 1 2%	1-3 28%	4-7 47%	8-12 21%	13+ 2%	
3. Number of weeks of formal school training received in the last 12 months.	None 40%	1-2 25%	3-4 17%	5-8 11%	9-16 4%	17+ 3%
4. Have you been an instructor in a Navy school?	Yes 11%	No 89%				
5. Have you taken the Shipboard Instructor Indocriation Course?	Yes 4%	No 96%				

"A" school graduates as worse or much worse, while 51% rated them as better or much better; 33% rated "A" school graduates the same as non-"A" school graduates. Respondents who had been to "A" school assessed their own "A" school training somewhat differently; 75% thought they were prepared average, well, or very well for supervised shipboard OJT, while 25% rated themselves as marginal or unprepared. The finding that 45% of supervisors rated "A" school graduates the same or worse than non-"A" school graduates emphasizes the need for effective OJT. In the view of many supervisors, "A" school graduation does not result in better job performance. When "A" schools fail to prepare students for their jobs, the responsibility for training shifts to the shipboard supervisor. Table 2 summarizes the training history and personnel supervised data.

On-the-Job Training Practices

Nearly all of the supervisors surveyed reported that petty officers and chief petty officers were responsible for most of the OJT that takes place aboard ship. Half the supervisors reported spending between 3 and 10 hours per week doing supervised OJT, while 30% reported spending more than 10 hours and 20% reported spending 2 hours or less. Supervisors indicated that between 25% and 50% of their time was spent working with trainees on PQSs and 10% was spent satisfying PARs.

When certifying completion of a PQS or PAR requirement, 60% of supervisors reported that they almost always or always observe trainees perform the task, 25% reported observing it sometimes, and less than 3% said they almost never or never observe it. Responding to two similar questions, 65% of the supervisors indicated that they almost never or never certify completion of a requirement if the trainees simply said they could do it, and over 60% said they would refuse to certify completion of a requirement if someone else said the trainee could do it. However, over 30% of the supervisors that responded to these two questions reported that they would certify completion if the trainee or someone else said that the trainee had accomplished the requirement.

Table 2

**Summary of Responses to Selected Questions About Personnel Supervised
and "A" School Quality**

Question	Supervisor Responses				
	0	1-2	3-4	5-6	7+
1. What is the total number of personnel you supervise (1% did not respond)?	7%	14%	18%	15%	45%
	0	1-2	3-4	5-6	7+
2. How many of the sailors you supervise have been to "A" school (5% did not respond)?	12%	22%	20%	14%	27%
	Very Well	Well	Average	Marginal	Unprepared
3. How well prepared are "A" school graduate for OJT?	5%	15%	43%	27%	10%
	Much Better	Better	Same	Worse	Much Worse
4. How does the job performance of "A" school graduates compare with non-"A" school graduates (7% did not respond)?	9%	42%	33%	8%	1%
	Very Well	Well	Average	Marginal	Unprepared
5. How well did "A" school prepare you for OJT?	13%	27%	36%	19%	5%

Over half the supervisors said that most of the time they use Planned Maintenance Systems (PMS) documents and technical manuals when conducting OJT. Over half also reported sometimes using special job aids and personally prepared materials. Less than 6% of supervisors reported that they never use any supplemental materials.

Responses to questions based on the assessment-training-evaluation model indicate that many supervisors are following OJT practices consistent with the model. Nearly 60% reported that most of the time they find out what the trainees know about the task before they begin training. However, 20% almost never or never find out beforehand and about 20% only do it sometimes. About 80% of the supervisors let trainees explain the task in their own words, while the rest sometimes, almost never, or never let them explain. Over 75% explain how the task relates to the overall operation of the ship, but 20% reported doing so sometimes, almost never, or never. When assessing task performance, 85% of the supervisors let trainees demonstrate what they can do most of the time, almost always, or always, while 15% allow it sometimes, almost never, or never. These percentages change when supervisors were asked if they would continue to let trainees demonstrate the task if they make mistakes. In this case, 72% would let the trainees demonstrate the skill most of the time, almost always, or always, while 28% would allow it sometimes, almost never, or never. This suggests that when mistakes are made, OJT supervisors are less willing to let trainees continue the demonstration. The vast majority of supervisors (80%) demonstrate skills to their trainees most of the time, almost always, or always, while 20% do it sometimes, or never. About the same proportion of supervisors break complex tasks into subtasks and combine small steps into larger ones. Table 3 summarizes the data for OJT practices.

We used responses to questions 26 through 32 (see the appendix) to compute an OJT quality index for each supervisor. We then used this index as a dependent variable for a series of one-way

Table 3

Summary of Responses to Selected Questions About On-the-Job Training Practices

Question	Supervisor Responses					
	Senior Off.	Junior Off.	Chief Petty Off.	Petty Off.		
1. Who is responsible for OJT aboard ship?	1%	1%	9%	89%		
2. How many hours do you spend per week doing OJT?	0 5%	1-2 13%	3-5 25%	6-10 25%	11-16 11%	17+ 21%
3. What % of your training time do you spend on PQS?	0 7%	1-9% 24%	10-25% 36%	25-50% 19%	50-75% 11%	75-100% 2%
4. What % of your training time do you spend on PARs?	0 12%	1-9% 43%	10-25% 30%	25-50% 10%	50-75% 3%	75-100% 1%
	Always	Almost Always	Most of the Time	Some-Times	Almost Never	Never
5. When you sign off someone for a PQS or PAR task, do you observe them doing the task?	31%	29%	25%	12%	1%	2%
6. When you sign off someone for a PQS or PAR task, do you sign off if they tell you they did it without watching them?	1%	2%	4%	28%	29%	36%
7. When you sign off someone for a PQS or PAR task, do you sign off if someone else tells you they did it?	1%	2%	5%	31%	19%	42%
8. When you do OJT do you use the Planned Maintenance Systems (PMS)?	18%	18%	23%	30%	5%	6%
9. When you do OJT, do you use Special Job Aids?	7%	11%	18%	46%	10%	8%
10. When you do OJT, do you use Technical Manuals?	17%	19%	23%	33%	5%	3%
11. When you do OJT, do you use materials you have personally prepared for the job?	7%	11%	18%	50%	9%	5%
12. How frequently do you find out what the sailor knows before you begin OJT (5% did not ask because they already knew what the trainee knew)?	13%	15%	28%	29%	7%	3%
13. How frequently do you let the sailor explain the task to you?	25%	28%	29%	15%	2%	1%
14. How frequently do you explain how the task fits into the operation of the ship?	27%	27%	24%	17%	3%	2%
15. How frequently do you let the sailor show you what he/she can and cannot do?	26%	31%	27%	13%	2%	1%
16. How frequently do you let the sailor demonstrate the task even though he/she makes mistakes?	17%	25%	29%	23%	4%	2%
17. How frequently do you show the sailor how to perform the task?	29%	25%	25%	19%	1%	1%
18. When you demonstrate a complex task, do you break it into a number of smaller steps?	31%	29%	24%	14%	1%	1%

analyses of variance (ANOVAs). The only significant effect was for the number of hours per week the supervisor engaged in OJT, $F(6,2309) = 6.30$, $p < 0.01$. Supervisors who spent the most time per week doing OJT scored highest on the OJT quality index. This result is consistent with the prescriptions of the model. Effective and complete assessment, training, and evaluation take time. Supervisors who do not ascertain what trainees already know, demonstrate tasks, break complex tasks in to smaller components, or provide explanations and feedback will not need as much time to accomplish OJT as those supervisors who do all of these things. There were no significant effects for the number of personnel supervised, pay grade, age, years in the Navy, years of Navy instructing, or having taken the shipboard instructor course.

Conclusions

We can draw three major conclusions from the facts and research cited in the introduction and the findings from the shipboard supervisor questionnaire. First, OJT is an important component of the Navy training process and is expected to become even more important as the Navy increases the emphasis on shipboard training in the coming years. Apprentice training and "A" school training do not and are not intended to produce personnel capable of independently performing jobs. Second, very few shipboard petty officers receive any information or training on how to conduct OJT. Third, while over 50% of the supervisors reported that they use appropriate OJT techniques, at least 20% do not, and another 30% are not as effective as they could be. Evidence from tutor training studies (Fitch & Semb, 1992; Johnson & Sulzer-Azaroff, 1978; Kuti, et al., 1992) shows that training can improve the performance of both tutors and the students they train. Therefore, there is both a need and a capability to improve the quality of shipboard OJT.

Recommendations

The Commanders-in-Chief of the Atlantic and Pacific Fleets in conjunction with the Afloat Training Organization should initiate a program to design, develop, and evaluate a training course for petty officers on how to conduct OJT based on the assessment-training-evaluation OJT model. This training could be brief, exportable, and delivered on videotape and could be accomplished by revising the existing Shipboard/Work Center Instruction Indoctrination Course (A 012 0023).

To ensure that petty officers are held accountable for their duties as on-the-job trainers, we recommend that the Afloat Training Organization develop an appropriate management system for use by ship training officers.

We also recommend that the Chief of Naval Education and Training (CNET) determine whether a similar course should become part of CNET leadership training.

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Appendix

Shipboard Supervisor Questionnaire

Shipboard Supervisor Questionnaire

On-the-job training is an important fleet activity that is growing at an increasing rate. Your responses to this questionnaire will help the Navy develop methods to enhance fleet readiness in general and improve on-the-job training in particular.

I. Personnel You Supervise

1. What is the total number of personnel you supervise?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ more than 7
- ☐ don't know

2. How many petty officers do you supervise?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ more than 7
- ☐ don't know

3. How many non-petty officers do you supervise?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ more than 7
- ☐ don't know

4. How many of the sailors you supervise have been to A School?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ more than 7
- ☐ don't know

5. How many of the sailors you supervise have been to C School(s)?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ more than 7
- ☐ don't know

6. How many of the sailors you supervise have not been to any school?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ more than 7
- ☐ don't know

7. How many of the sailors you supervise have been to Seaman/Fireman/Airman Apprentice School?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5-6
- ☐ more than 7
- ☐ don't know

II. Previous Training

8. A School is designed to prepare sailors for supervised on-the-job training (OJT). (If you did not attend A School, go to Question 9.) How well did A school prepare you for supervised OJT?

- ☐ Very Well
- ☐ Well
- ☐ Average
- ☐ Marginal
- ☐ Unprepared

9. In your opinion how well prepared for supervised OJT are today's A school grads when they first arrive aboard ship?

☐ Very Well
☐ Well
☐ Average
☐ Marginal
☐ Unprepared

10. If you have supervised both A School graduates and sailors that have not attended A school, how does their job performance compare in your opinion? A School grads are:

☐ Much Better
☐ Better
☐ the Same as
☐ Worse
☐ Much Worse

III. Workplace Training

11. Who actually does and/or is responsible for most of the OJT that takes place aboard ship?

☐ Senior Officers (LCDR to CAPT)
☐ Junior Officers (Ensign to LT)
☐ Chief Petty Officers (E-7 to E-9)
☐ Petty Officers (E-4 to E-6)

12. How many hours do you spend per week training personnel on-the-job?

☐ 0
☐ 1-2
☐ 3-5
☐ 6-10
☐ 11-16
☐ 17-24
☐ more than 24

13. What percentage of your training time do you spend working with others on Personnel Qualification Standards (PQS)?

- ☐ 0%
- ☐ 1-9%
- ☐ 10-25%
- ☐ 25-50%
- ☐ 50-75%
- ☐ 75-100%

14. What percentage of your training time do you spend working with others on Personnel Advancement Requirements (PARs)?

- ☐ 0%
- ☐ 1-9%
- ☐ 10-25%
- ☐ 25-50%
- ☐ 50-75%
- ☐ 75-100%

15. What percentage of your training time do you spend working with others on Watch Standing Qualifications?

- ☐ 0%
- ☐ 1-9%
- ☐ 10-25%
- ☐ 25-50%
- ☐ 50-75%
- ☐ 75-100%

16. When you sign-off someone for a task, such as a PQS or PARs, do you actually observe them doing the task?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never

17. When you sign-off someone for a task, such as a PQS or PARs, do you sign off if they tell you they did it (or can do it) without actually watching them?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never

18. When you sign-off someone for a task, such as a PQS or PARs, do you sign off if someone else tells you they did it (or can do it)?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never

19. When you sign-off someone for a task, such as a PQS or PARs, do you ever provide any assistance or guidance during the sign off session?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never

20. When you train someone on-the-job, do you use Planned Maintenance Subsystems (PMS)?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never

21. When you train someone on-the-job, do you use Special Job Aids?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never

22. When you train someone on-the-job, do you use Technical Manuals?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never

23. When you train someone on-the-job, do you use material you have personally prepared for the job?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never

24. When you train an A school graduate on-the job, how frequently do you find out what the sailor already knows about the task before you begin?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never
- ☐ I don't ask because I usually know what the trainee already knows.

25. When you train a sailor who has not been to A school on-the job, how frequently do you find out what the sailor already knows about the task before you begin?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never
☐ I don't ask because I usually know what the trainee already knows.

26. When you train someone on-the job, how frequently do you let the sailor explain the task to you in his/her own words?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never

27. When you train someone on-the job, how frequently do you explain how the task fits into the operation of the ship?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never

28. When you train someone on-the job, how frequently do you let the sailor show you what he/she can and cannot do?

☐ always
☐ almost always
☐ most of the time
☐ sometimes
☐ almost never
☐ never

29. When you train someone on-the job, how frequently do you let the sailor demonstrate the task even though he/she makes mistakes?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never

30. When you train someone on-the job, how frequently do you show the sailor how to perform the task?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never

31. When you demonstrate a complex task, do you break it into a number of smaller steps?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never

32. If the answer to the previous question (#31) is yes, when you finish, do you then combine small steps into larger ones?

- ☐ always
- ☐ almost always
- ☐ most of the time
- ☐ sometimes
- ☐ almost never
- ☐ never



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IV. Information About You

33. Rating

34. Paygrade

- ☐ E-4
☐ E-5
☐ E-6
☐ E-7
☐ E-8
☐ E-9
☐ Officer

35. NEC(s)

36. Age

- ☐ 17-20
☐ 21-25
☐ 26-30
☐ 31-35
☐ 36-40
☐ 41+

37. Years in Navy

- ☐ 1-3
☐ 4-7
☐ 8-12
☐ 13-18
☐ 19+

38. Years at present command

- ☐ Less than 1
☐ 1-3
☐ 4-7
☐ 8+

39. Years of sea duty

- ☐ Less than 1
☐ 1-3
☐ 4-7
☐ 8-12
☐ 13+



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40. Rank/Rate/Rating of your immediate supervisor

41. Type of ship on which you are stationed.

42. Number of weeks of formal school training you have received in the last 12 months:

- ☐ None
- ☐ 1-2 weeks
- ☐ 3-4 weeks
- ☐ 1-2 months
- ☐ 3-4 months
- ☐ more than 4 months

43. Have you been an instructor in a Navy school?

- ☐ Yes
- ☐ No

44. If you have been an instructor in a Navy school, how many years have you taught?

- ☐ Less than 1
- ☐ 2-3
- ☐ 4-7
- ☐ 8+

45. Have you taken the Shipboard/Work Center Instructor Indoctrination Course (A 012 0023)?

- ☐ yes → please answer the remaining questions.
☐ no → you have completed the questionnaire. Please place it in the enclosed envelope and put it in the mail.

46. Have you prepared learning objectives and/or instructional materials using the methods taught in the course?

- ☐ yes
☐ no

47. Have you used the three step demonstration strategy taught in the course when you worked with apprentices?

- ☐ yes
☐ no
☐ do not remember the strategy

48. Have you used the five step technique for asking oral questions taught in the course when you worked with apprentices?

- ☐ yes
☐ no
☐ do not remember the strategy

49. Which of the following statements best describes your opinion of the course?

- ☐ Very useful and relevant. I used what I learned almost every day.
☐ Useful. I have used what I learned often.
☐ Somewhat useful. I have used what I learned occasionally.
☐ Not very useful. I have used what I learned very infrequently.
☐ Not useful or relevant. The course wasted my time.



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Commanding Officer, Readiness Training Facility, Ferndale, CA
Commander, Naval Air Force, U.S. Atlantic Fleet
Commander, Naval Air Force, U.S. Pacific Fleet
Commander, Naval Surface Force, U.S. Pacific Fleet
Commander, Submarine Force, U.S. Atlantic Fleet
Commander, Submarine Force, U.S. Pacific Fleet
Commander, Submarine Force, U.S. Pacific Fleet (Code 12) (2)
Commander, Fleet Training Group, U.S. Atlantic Fleet
Commander, Fleet Training Group, U.S. Pacific Fleet
Commander, Submarine Group 2
Commander, Patrol Wings, U.S. Atlantic Fleet
Commander, Patrol Wings, U.S. Pacific Fleet
Commander, Anti-Submarine Warfare Wing, U.S. Pacific Fleet
Commander, Sea Based ASW Wing, U.S. Atlantic Fleet
Commanding Officer, Fleet Aviation Specialized Operational Training Group, U.S. Atlantic Fleet
Commanding Officer, Fleet Aviation Specialized Operational Training Group, U.S. Pacific Fleet
Commander, Air Anti-Submarine Wing 1, U.S. Atlantic Fleet
Commander, Helicopter Sea Control Wing 1, Naval Air Station, Norfolk, VA